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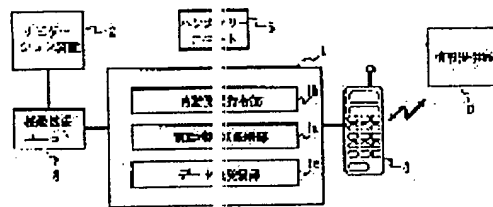
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(54) COMMUNICATION EQUIPMENT

(57)Abstract:

PROBLEM TO BE SOLVED: To shorten communication establishment time regardless of the difference of the kind of a telephone set to be connected to a communication equipment capable of data communication by connecting the telephone set.

SOLUTION: A traffic information communication equipment 1 is provided with a telephone set kind identification part 1a, an automatic call origination command part 1b and a data transmission/reception part 1c. The telephone set kind identification part 1a identifies the kind of the telephone set 4 connected to the traffic information communication equipment 1. The automatic call origination command part 1b commands the telephone set 4 to automatically originate a call to the corresponding telephone set of the same machine kind of an information providing station 6 corresponding to a result identified by the telephone set kind identification part 1a when the acquisition of traffic information is requested from a navigation device 2. The data transmission/reception part 1c transmits and receives data with the information providing station 6 through the telephone set 4 on condition that the telephone set 4 is line-connected to the telephone set of the information providing station 6 based on the command of the automatic call origination command part 1b.



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CLAIMS

[Claim(s)]

[Claim 1] A telephone number storage means classified by model to memorize the telephone number according to each model of telephone set which is the communication device in which data communication with an information offer station is possible, and was installed in said information offer station by telephone set. A telephone set connecting means which a telephone set of the same model as a telephone set installed in said information offer station can at least 2-model connect, A model discernment means to identify a model of telephone set connected to this telephone set connecting means, An auto-sending directions means to direct auto calling to said information offer station to a telephone set which read the telephone number of the same model as a model identified with this model discernment means from said telephone number storage means classified by model, and was connected to said telephone set connecting means, A communication device characterized by having a data transceiver means which transmits and receives data between said information offer stations on condition that a communication line of a telephone set connected to said telephone set connecting means and a telephone set of said information offer station was connected.

[Claim 2] Said auto-sending directions means is a communication device according to claim 1 characterized by notifying a user of the telephone number of the same model read from said telephone number storage means classified by model when auto calling by said telephone set is impossible.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to a communication device, for example, is used with navigation equipment, and relates to the communication device which performs an information communication link between the information offer stations which offer various kinds of information, such as coordinate information, such as traffic information and a destination, and search-path information to the destination, with a telephone set.

[0002]

[Description of the Prior Art] In recent years, the navigation equipment which performs path guidance geographically to the destination to an unfamiliar operator is put in practical use. A map is displayed on the display of liquid crystal etc. and the path to the destination inputted on it and the destination searched by path planning, the self-vehicle location under transit, the transit locus till then, etc. are expressed as this navigation equipment in piles. An operator can acquire the course information to which he should progress by referring to this display serially, and can arrive at the destination by moving according to directions of the direction of a course.

[0003] With such conventional navigation equipment, although the route to the destination can be known as mentioned above, the delay condition of the road etc. cannot be known. In order to solve this, there is membership system service which offers the traffic information taken into consideration to that delay by communication link from an information offer station, and this service is called ATIS (ATISU). The traffic information acquired from an information offer station (ATIS pin center, large) by this ATIS by communication link is the delay information on a general trunk road and Metropolitan Expressway at present, the duration of the specific section, the closing condition of Metropolitan Expressway, the use condition of a parking lot, road-repairing information, etc. Furthermore, if a departure point and a destination point are sent to an information offer office, it is searched for the shortest path in which delay information at present was also taken into consideration, based on this, and the data for which it looked can come to hand from an information offer office.

[0004]

[Problem(s) to be Solved by the Invention] However, since an exchange of the data based on the communication link with navigation equipment and an above-mentioned information offer station needs to use the telephone line, with the navigation equipment for mount, devices, such as a processor for a portable telephone or the telephone for automobiles being surely needed upwards, and communicating with a modem and an information offer station further, are needed. Moreover, an operator operates a portable telephone etc., an information offer station is called each time, and on condition that the telephone set of an information offer station and the portable telephone set of self were connected by the circuit, the communication link of data is attained between navigation equipment and an information offer station to acquire required information from an information offer station.

[0005] However, the classification of the portable telephone which the owner of navigation equipment owns is various by the owner. Therefore, when the portable telephone to own and the telephone set of an information offer office are the same models and it communicates among both telephone sets, time amount (henceforth communication link establishment time amount) until it can start a communication link is as short as about 1 - 2 seconds. On the other hand, when the models of both telephone sets differ, the communication link establishment time amount becomes comparatively long with about 20 seconds. Therefore, in the Prior art, when navigation equipment obtained data from an information offer station, depending on the model of portable telephone to own, the communication link establishment time amount with an information offer station became long, and might be kept waiting for a long time. Moreover, since communication link time amount became long as a whole, there was a problem that communication link cost started.

[0006] Then, this invention is a communication device which the communication link of data with an information offer station is possible, for example, is used with navigation equipment by the telephone set, and aims at offering the communication device in which communication link establishment in a short time is possible irrespective of the difference in the model of telephone set connected.

[0007]

[Means for Solving the Problem] A telephone number storage means classified by model to memorize the telephone number according to each model of telephone set which is the communication device in which data communication with an information offer station is possible, and was installed in said information offer station by telephone set in invention according to claim 1, A telephone set connecting means which a telephone set of the same model as a telephone set installed in said information offer station can at least 2-model connect, A model discernment means to identify a model of telephone set connected to this telephone set connecting means, An auto-sending directions means to direct auto calling to said information offer station to a telephone set which read the telephone number of the same model is a model identified with this model discernment means from said telephone number storage means classified by model, and was connected to said telephone set connecting means, A communication device is made to possess a data transceiver means which transmitted and receives data between said information offer stations, on condition that a communication line of a telephone set connected to said telephone set connecting means and a telephone set of said information offer station was connected, and said purpose is

attained. In invention according to claim 2, in a communication device according to claim 1, when auto calling by said telephone set is impossible for said auto-sending directions means, it notifies a user of the telephone number of the same model read from said telephone number storage means classified by model.

[0008]

[Embodiment of the Invention] The gestalt of the suitable operation at the time of applying the communication device of this invention to navigation equipment below is explained in details with reference to drawing 3 from drawing 1. Drawing 1 is the block diagram showing the structure of a system of a communication device. As the communication device of the gestalt of this operation is shown in drawing 1, transfer of data is connected for the traffic information communication device 1 and navigation equipment 2 possible through the functional expansion unit 3. Moreover, in order to connect two or more models of telephone sets 4 to the traffic information communication device 1 and to acquire the traffic information on desired, and the various information about path planning according to the demand from navigation equipment 2, it is constituted so that it can communicate between the information offer stations 6 through a telephone set 4 and the telephone line (not shown). The telephone sets 4 connectable with the traffic information communication device 1 are a portable telephone, a land mobile radiotelephone, etc. The handsfree unit 5 equipped with the microphone which is not illustrated and the loudspeaker is connected to this traffic information communication device 1, and by using the microphone and loudspeaker of this handsfree unit 5, without taking the ear receiver of a telephone set 4, a user is constituted so that the operator and conversation of the information offer station 6 may be made.

[0009] Moreover, the traffic information communication device 1 is equipped with telephone set classification discernment section 1a, auto-sending command section 1b, and data transceiver section 1c as shown in drawing 1. Telephone set classification discernment section 1a identifies the classification (class) of the telephone set 4 connected to the traffic information communication device 1. When there is a demand of acquisition of traffic information from navigation equipment 2, auto-sending command section 1b performs the command so that a telephone set 4 may auto-send to the telephone set of the same model with which the information offer station 6 corresponds according to the result identified by telephone set kind discernment section 1a. Therefore, it corresponds to the model of telephone set 4 connected to the traffic information communication device 1, and many telephone sets of the same model as these models are installed in the information offer station 6. On condition that, as for data transceiver section 1c, the telephone set and circuit of the information offer station 6 were connected for the telephone set 4 based on the command of auto-sending command section 1b, data is transmitted and received between the information offer stations 6 through a telephone set 4. The data which this data transceiver section 1c received is supplied to navigation equipment 2.

[0010] Drawing 2 is the block diagram showing the detailed configuration of the traffic information communication device 1 shown in drawing 1. While this traffic information communication device 1 performs data processing like [as shown in drawing 2, it has CPU (central processing unit) 11, and] the after-mentioned in this CPU 11, actuation of each part is controlled. ROM (read only memory) 11a which stored beforehand the procedure (program) for CPU 11 to control actuation of data processing performed like the after-mentioned or each part, and RAM (random access memory) 11b which stores various kinds of data temporarily are built in CPU 11. The external unit data exchange means 12 and the voice data processing means 13 are connected to CPU 11 through the bus.

[0011] ROM (read only memory) 14, nonvolatile memory 15, and an interface 16 are connected to the external unit data exchange means 12. The interface 16 is connected with navigation equipment 2 through the functional expansion unit 3. The program for the functional expansion unit 3 to control the traffic information communication device 1 is stored in ROM 14, and CPU (central processing unit) which is not illustrated in the functional expansion unit 3 controls the traffic information communication device 1 according to the contents of the program stored in ROM 14. An interface 16 is a standard interface which is specified for example, to PC card specification. Therefore, the memory card which has the interface based on the aforementioned specification can be mounted in the functional expansion unit 3. When a memory card is mounted, it can use for information offer of expansion of the working-level month memory of navigation equipment 2, or the map information on navigation equipment 2.

[0012] The traffic information communication device 1 is equipped with the interface 18 linked to various telephone sets, while it is equipped with the interface 17 linked to the microphone of a handsfree unit 5, and a loudspeaker. Corresponding to the various telephone sets installed in the information offer station 6, digital 9600 portable telephone 4a in which 9600bps data communication is possible, digital 2400 portable telephone 4b in which 2400bps data communication is possible, analog type portable telephone 4c, and other various telephone sets can be connected now to an interface 18. Change-over contact of the change-over switch 20 which performs a change with the sound signal and data signal which are outputted outside is connected to the interface 18 from change-over contact and the traffic information communication device 1 of the change-over switch 19 which performs a change with the sound signal of an analog gestalt and the data signal of a digital gestalt which are inputted from the outside to the traffic information communication device 1.

[0013] One stationary contact of a change-over switch 19 is connected to CPU 11, and the stationary contact of the another side is connected to the input side of the signal amplifier (AMP) 21. The output side of the signal amplifier 21 is connected to the input side of a filter 22. The output side of a filter 22 is connected to the input side of A/D converter 23. Furthermore, the output side of A/D converter 23 is connected to the voice data processing means 13. The stationary contact of another side of a change-over switch 19 is further connected to the input side of the signal amplifier (AMP) 25 through the switch 24. The output side of this signal amplifier (AMP) 25 is connected to the loudspeaker (not shown) of a handsfree unit 5 through the interface 17.

[0014] In order that one stationary contact of a change-over switch 20 may take out the data from a CPU 11 outside, it connects with CPU 11, and the stationary contact of the another side is connected to change-over contact of the change-over switch 28 for taking out outside from the signal amplifier 26 to an output signal, the output signal from the signal amplifier 27, and a selection target. The input side of the signal amplifier 26 is connected to the microphone (not shown) of a handsfree unit 5 through the interface 17. Moreover, the input side of the signal amplifier 27 is connected to the output side of a filter 29. The input side of a filter 29 is connected to the output side of D/A converter 30. Furthermore, the input side of D/A converter 30 is connected to the voice data processing means 13.

[0015] Furthermore, in order to control the gain of each amplifier, it is constituted by the signal amplifier 21, the signal

amplifier 27, the signal amplifier 26, and the signal amplifier 25 so that control signals Sig1-Sig4 may be supplied from CPU11. Moreover, the control signals Sig5-Sig8 for controlling closing motion or change over of each switch are constituted by a switch 24, a change-over switch 19, a change-over switch 20, and the change-over switch 21 so that it may be supplied from CPU11.

[0016] Drawing 3 expresses the configuration of navigation equipment 2. This navigation equipment 2 is equipped with operation part 40 as shown in drawing 3. The display 41 which contains in this operation part 40 switch 41b for actuation prepared in the perimeter of display 41a which functions as a touch panel, and this display 41a, with the switch input Management Department 42 which manages the input from the touch panel of this display 41, or switch 41b. The functional expansion unit 3 is connected with the current position test section 43, the speed sensor 44, the map information storage section 45, the speech recognition section 46, the voice output section 47, and the telephone number table storage section 53.

[0017] The current position test section 43 is detecting the coordinate data based on the LAT and LONG, and detects the current position which vehicles have stopped [which has stopped and has current-run]. The GPS (Global Position System) receiver 48 which measures the location of vehicles using a satellite, the beacon receiving set 49 which receives the positional information from the beacon arranged in the road, the bearing sensor 50, and a distance robot 51 are connected to this current position test section 43, and the current position test section 43 measures the current position of vehicles using the information from these.

[0018] The wheel sensor which computed the amount of displacement of bearing by the bearing sensor 50 arranging gyroscopes, such as a gas rate gyro which detects the angular rate of rotation of the earth magnetism sensor which detects earth magnetism and asks for bearing of vehicles, and vehicles, integrates with the angular velocity, and asks for bearing of vehicles, and an optical fiber gyroscope, and a wheel sensor on either side, and detecting revolution of vehicles according to the output pulse difference (difference of migration length) is used. Various kinds of methods, such as that with which a distance robot 51 detects and carries out counting of the rotational frequency of a wheel, or detects acceleration, and it integrates twice, are used. In addition, although location measurement is independently possible for the GPS receiver 48 and the beacon receiving set 49, in the location in which reception by the GPS receiver 48 or the beacon receiving set 49 is impossible, the current position is detected with the bearing sensor 50 and the dead-reckoning navigation which used the both sides of a distance robot 51.

[0019] The map information storage section 45 is equipped with the map data storage section, the crossing data storage section, the node data storage section, the search-path data storage section, and the road data storage section. While performing path planning, the path for which it searched is met, display a map, take out a crossing, the characteristic photograph in the middle of a path, and coma drawing to each [these] storage section, the traveling direction in the remaining distance by the crossing and the next crossing is displayed on it, or the various data for outputting the guidance information on other is stored in it. As for each storage section, various storage, such as a floppy disk, a hard disk, CD-ROM, an optical disk, a magnetic tape, an IC card, and an optical card, is used.

[0020] The microphone 52 into which human being's voice and the dial tone corresponding to the telephone number are inputted is connected to the speech recognition section 46. The voice output section 47 is equipped with IC54 for voice outputs which outputs voice as an electrical signal, D/A converter 55 which carries out digital to analog conversion of the output of this IC54 for voice outputs, and the amplifier 56 which amplifies the changed analog signal. The loudspeaker 57 is connected to the outgoing end of amplifier 56.

[0021] The telephone number for every model with which the information offer office 6 is equipped is stored in the telephone number table storage section 53. That is, many digital 9600 portable telephone in which 9600bps data communication is possible, digital 2400 portable telephones in which 2400bps data communication is possible, analog type portable telephones, and other various telephone sets are installed in the information offer station 6, and the telephone number of each [these] model is stored in the telephone number table storage section 53. And the telephone number of the same model as the telephone set connected to the interface 18 of the traffic information communication device 1 is read from the telephone number table storage section 53, and is notified to the traffic information communication device 1.

[0022] The map data reading section 58 by which operation part 40 was connected to the speed sensor 44 and the map information storage section 45, With the map drawing section 59 and the map Management Department 60 which manages the map data reading section 58 and the map drawing section 59 With the screen management section 61 connected to the map drawing section 60 and a display 41, and the input Management Department 62 connected to the switch input Management Department 42 and the speech recognition section 46 With the voice output Management Department 63 connected to IC54 for voice outputs of the voice output section 47 It has the communication management section 64 which manages communications control with the traffic information communication device 1 and the map Management Department 60, the screen management section 61, the input Management Department 62, the voice output Management Department 63, and the whole Management Department 65 that manages the communication management section 64. This operation part 40 realizes each above-mentioned configuration by having CPU (central processing unit), ROM (read only memory), RAM (random access memory), etc., and performing the program in which CPU was stored in ROM by making RAM into working area.

[0023] Here, the outline of actuation of the navigation equipment 2 explained as mentioned above is explained. Operation part 40 will detect the current position with the input data from the current position test section 43, and this navigation equipment 2 will start retrieval of the optimal path to the destination inputted from the current position with each data of the map information storage section 45, if the destination is inputted by the operator of vehicles from display 41a or a microphone 52. After this retrieval is completed, a map is displayed on display 41a and the path to the destination inputted on that map and the destination searched by path planning, a self-vehicle location, etc. are displayed in piles. Initiation of transit of vehicles displays a transit locus etc. on display 41a in piles further. Therefore, an operator can acquire the course information to which he should progress by referring to this display 41a serially.

[0024] In the path guidance in such navigation equipment 2, by acquiring predetermined traffic information and navigation information from the information offer office 6, it can search for the path which avoided delay etc., the coordinate information on the destination can be acquired, or suitable path guidance and quick path planning can be performed by having the path planning to the destination performed in the information offer office 6, and acquiring the search-path

information further.

[0025] Hereafter, the communication link by the telephone line for acquiring such information from the information offer station 6 is explained about actuation. First, how the traffic information communication device 1 identifies the classification of the telephone sets 4a-4c connected to the interface 18 of the traffic information communication device 1 is explained. If the classification of telephone sets 4a-4c sticks for whether being a digital type portable telephone or an analog type portable telephone, it changes the cable linked to an interface 18, and its jack, for example, and can identify by detecting the difference by the detecting signal.

[0026] Moreover, discernment of digital 9600 portable telephone 4a or digital 2400 portable-telephone 4b can be checked by the difference in the response, when CPU11 sends [as opposed to / in the digital type portable telephone connected / a telephone set] out the communication equipment control signal CS and carries out a specific inquiry. In the case of the concrete for example, telephone set by NTT Mobile Communications Network, Inc., delivery and the thing which answers discriminate the non-call-service demand command which is supporting only digital 9600 portable telephone from digital 9600 portable-telephone 4a to a telephone set, and a thing without the answerback is discriminate from digital 2400 portable-telephone 4b. CPU11 notifies the classification of the identified telephone set to the functional expansion unit 3 through the external unitdata exchange means 12 and an interface 16. Furthermore, the functional expansion unit 3 notifies the classification of a telephone set to navigation equipment 2.

[0027] By the way, the user of navigation equipment 2 can do acquisition (acquisition) of various information, such as navigation information, such as coordinate information on traffic information, such as delay information, traffic accident information, and construction information, the current position, or the destination, and search-path information which performed the path planning to the destination, from the information offer station 6 by operating the traffic information communication device 1 if needed. Actuation of navigation equipment 2 and the traffic information communication device 1 differs by the ability of the telephone sets 4a-4c connected to the interface 18 of the traffic information communication device 1 to auto-send acquisition of this traffic information.

[0028] That is, if a user directs acquisition initiation of the traffic information from the information offer station 6 by use of display 41a of navigation equipment 2, or a microphone 52 when telephone sets 4a-4c can be auto-sent, these directions will be transmitted from navigation equipment 2 to the traffic information communication device 1, and on condition that this, the traffic information communication device 1 will start actuation like the after-mentioned. On the other hand, as well as the case where it can auto-send when a telephone set 4 cannot be auto-sent, a user directs acquisition initiation of traffic information by use of display 41a of navigation equipment 2, or a microphone 52. Then, the means of the signal transduction for users informs a user of the purport to which make a user make a telephone set 4 send [equipment / 2 / carrier beam navigation] these directions by manual actuation. That is, it displays on display 41a of navigation equipment 2, or a user is notified by carrying out a voice output to the loudspeaker 57 connected to the voice output section 47.

[0029] Next, actuation of the traffic information communication device 1 in case the digital portable telephone of either digital 9600 portable telephone 4a which can be auto-sent, or digital 2400 portable-telephone 4b is connected to the traffic information communication device 1 is explained. In this case, as mentioned above, from navigation equipment 2, if directions of auto-sending initiation are sent out to the functional expansion unit 3, the carrier beam functional expansion unit 3 sends out directions of auto-sending initiation for these directions to the traffic information communication device 1. In that case, based on the model discernment result of the telephone sets 4a and 4b connected to the interface 18 already notified from the traffic information communication device 1, navigation equipment 2 reads the telephone number of the same model from the telephone number table storage section 53, and notifies it to the functional expansion unit 3 and the traffic information communication device 1 at directions and coincidence of auto-sending initiation. In addition, you may be the configuration which replace with this, internal ROM14 or the nonvolatile memory 15 of the traffic information communication device 1 is made to memorize the telephone number of a dispatch place beforehand, and the functional expansion unit 3 reads this, and is notified to the traffic information communication device 1.

[0030] Thus, the traffic information communication device 1 which received directions of auto-sending initiation outputs the communication equipment control signal CS from CPU11, and it controls it so that digital 9600 portable telephone 4a or digital 2400 portable-telephone 4b operates auto calling. Under the present circumstances, CPU11 controls actuation of digital 9600 portable telephone 4a or digital 2400 portable-telephone 4b by using the communication equipment control signal CS to connect in the condition that it can telephone to the operator of the information offer station 6 instead of the information offer station 6 and the condition which can carry out data communication. Moreover, in this case, by digital 9600 portable-telephone 4a and digital 2400 portable-telephone 4b, since a part of contents of the control command sent out as a communication equipment control signal CS differ, it identifies as mentioned above whether which portable telephone is connected, and the control command according to the classification of that identified telephone set is generated.

[0031] Navigation equipment 2 displays on display 41a, or it is carrying out the voice output of the purport the traffic information communication device's 1 having started auto calling to the loudspeaker 57 connected to the voice output section 47, and a user is notified of it. Then, the traffic information communication device 1 acquires the right-or-wrong information on the line connection by the auto calling from digital 9600 portable telephone 4a or digital 2400 portable telephone 4b through the communication equipment control signal CS. The right-or-wrong information on this line connection is transmitted to navigation equipment 2 through the functional expansion unit 3. Navigation equipment 2 displays on display 41a, or is carrying out a voice output to the loudspeaker 57 connected to the voice output section 47, and notifies a user of the right-or-wrong information on this transmitted line connection.

[0032] Thus, if digital 9600 portable telephone 4a or digital 2400 portable-telephone 4b is connected with the telephone set of the information offer station 6 through the telephone line, it will shift to "talk mode." This "talk mode" is the mode in which a user and the operator of the information offer station 6 talk. If it shifts to this "talk mode", CPU11 will be switched to the contact of change-over switch 19 illustration-bottom with a control signal Sig7 so that, as for the input signal from digital 9600 portable telephone 4a or digital 2400 portable telephone 4b to the traffic information communication device 1, this input signal may be inputted into the sound signal amplifier 21 and a switch 24 for a sound signal. Furthermore, CPU11 is controlled so that the contact of a switch 24 closes with a control signal Sig5.

[0033] Consequently, since the sound signal from digital 9600 portable telephone 4a or digital 2400 portable telephone 4b is

inputted into the signal amplifier 25, and is amplified and this amplified signal is supplied to the loudspeaker of a handsfree unit 5, the voice according to a signal can be heard from a loudspeaker. The gain of the signal amplifier 25 can carry out adjustable with the control signal Sig4 from CPU11, and can carry out adjustable [of the sound volume from the loudspeaker from a handsfree unit 5] with adjustable [this].

[0034] CPU11 controls the gain of the signal amplifier 25 by the control signal Sig4 to become the gain according to digital 9600 portable telephone 4a or digital 2400 portable-telephone 4b connected to the traffic information communication device 1. Moreover, since the sound volume modification directions from navigation equipment 2 are transmitted to the traffic information communication device 1 through the functional expansion unit 3 by issuing the directions whose user changes the sound volume of a handsfree unit 5 to navigation equipment 2, based on the directions, CPU11 operates a control signal Sig4, and controls the gain of the signal amplifier 25.

[0035] CPU11 switches the contact of a change-over switch 20 to the bottom from the location of illustration with a control signal Sig8 at the same time it switches the contact of a change-over switch 28 to the bottom from the location of illustration with a control signal Sig6, since the sound signal of the microphone of a handsfree unit 5 is amplified with the signal amplifier 26 and this amplified signal is outputted to the exterior of the traffic information communication device 1.

Therefore, the voice output signal from the microphone of the user of a handsfree unit 5 is [0036] supplied to digital 9600 portable telephone 4a or digital 2400 portable-telephone 4b through a change-over switch 28, a change-over switch 20, and an interface 18 after the signal amplifier 26 is supplied through an interface 17 and amplified with this signal amplifier 26. The gain of the signal amplifier 26 can carry out adjustable with the control signal Sig3 from CPU11, and can carry out adjustable [of the magnitude of the signal outputted to digital 9600 portable telephone 4a or digital 2400 portable-telephone 4b connected to the traffic information communication device 1 with adjustable / this]. Therefore, CPU11 controls the gain of the signal amplifier 26 by the control signal Sig3 to become the gain which digital 9600 portable telephone 4a or digital 2400 portable-telephone 4b needs.

[0037] By these actuation of a series of, the conversation with the operator of the information offer station 6 of a user is attained through digital 9600 portable telephone 4a or digital 2400 portable-telephone 4b connected to the traffic information communication device 1 by the handsfree unit 5. In this conversation, a user tells the purport which wants for traffic information, such as delay information on a general trunk road and Metropolitan Expressway at present, a duration of the specific section, a closing condition of Metropolitan Expressway, a use condition of a parking lot or road-repairing information, to come to hand if needed to an operator. Furthermore, when a user desires acquisition in consideration of the delay information to a destination point of the retrieval result of the shortest path, a user tells an operator a departure point and a destination point.

[0038] And after an above-mentioned conversation is completed, it shifts to "data communication mode" from the "conversational mode." This "data communication mode" is the mode in which the traffic information communication device 1 and the information offer station 6 exchange data through a portable telephone. The shift conditions which shift to this "data communication mode" are based on sending out of the mode change signal from the information offer station 6 to the traffic information communication device 1. Next, the traffic information communication device 1 explains the actuation which receives the mode change signal from the information offer station 6.

[0039] As mentioned above, the sound signal from digital 9600 portable telephone 4a or digital 2400 portable telephone 4b is supplied also to the signal amplifier 21 at the same time a handsfree unit 5 is supplied. Adjustment of gain is possible for the signal amplifier 21, and CPU11 controls the gain by the control signal Sig1 to become the gain according to digital 9600 portable telephone 4a or digital 2400 portable-telephone 4b connected. After a high frequency component is cut with a filter 22, A/D conversion of the sound signal amplified with the signal amplifier 21 is carried out by A/D converter 23, and it is incorporated by the voice data processing means 13. The voice data incorporated in the voice data processing means 13 is supplied to CPU11, after digital filtering etc. is processed.

[0040] In CPU11, it identifies whether whether the mode change signal's being included in the inputted digital voice data and a mode change signal that is, were received. This discernment is performed about the inputted digital voice data by always comparing the feature of mode change signals, such as amplitude of the frequency of a signal, signal sending-out time amount, or a signal. When a mode change signal is a 1500Hz sine wave and specifically considers as continuation sending-out for 300ms, CPU11 blocks the inputted digitized voice data for example, per 50ms, and it is 1. The frequency of input voice is computed by counting a sound volume peak point within a block. However, since there is a possibility of incorrect recognition only at the count of the peak point, when there is a part where the time amount of a peak point and the following peak point is especially short, or long, the block may add the decision made on it not being a mode change signal. Furthermore, when each peak value is not uniform, the block may add the decision made on it not being a mode change signal.

[0041] When four or more blocks judged to be mode change signals continue by such actuation, it is judged that the mode change signal was received. Since the voice of the single frequency of 1500Hz cannot hardly continue 200ms or more in the usual conversation, a possibility of incorrect-recognizing voice to be a mode change signal is low. Moreover, since the speech compression method VSELP used for the present digital type cellular phone reproduces a 1500Hz sine wave comparatively faithfully, its a possibility that a mode change signal cannot be recognized to that of a carrier beam is also low. In addition, the above-mentioned mode change signal may be the synthetic wave of two or more frequency. In this case, after operating two or more digital filters in the voice data processing means 16 to juxtaposition and separating two or more frequency, the burden of processing of CPU11 can be made light by supplying that separated digital voice data to CPU11. Furthermore, in the implementation method of the above-mentioned mode change signal, frequency may be changed gradually or sound volume may be changed gradually.

[0042] By such a series of processings, if the traffic information communication device 1 receives the mode change signal from the information offer station 6, the traffic information communication device 1 will send the receiving status of a mode change signal to the functional expansion unit 3. On condition that reception of the mode change signal of the traffic information communication device 1, when are changed into "data communication mode" from "talk mode" and the traffic information communication device 1 judges, or when the functional expansion unit 3 judges and it notifies to the traffic information communication device 1, the traffic information communication device 1 shifts to "data communication mode."

[0043] If it shifts to this "data communication mode", CPU11 will be first controlled using a communication equipment control signal so that digital 9600 portable telephone 4a or digital 2400 portable-telephone 4b connected shifts to data communication mode. Under the present circumstances, by digital 9600 portable-telephone 4a and digital 2400 portable-telephone 4b, since a part of contents of the control command sent out as a communication equipment control signal from CPU11 differ, CPU11 generates the control command according to the model of portable telephone connected to **** using the discernment result at the time of identifying the portable telephone connected like.

[0044] Furthermore, if it shifts to "data communication mode", since the input signal inputted into the traffic information communication device 1 from digital 9600 portable telephone 4a or digital 2400 portable telephone 4 will be changed into digital data from a sound signal, in order to supply this digital data to CPU11, CPU11 changes the contact of a changeover switch 19 from the bottom to the bottom with a control signal Sig7. Moreover, the output signal outputted to external digital 9600 portable telephone 4a or digital 2400 portable-telephone 4b from the traffic information communication device 1 needs to change the sound signal from a handsfree unit 5 into digital data from CPU11. Therefore, CPU11 changes the contact of a changeover switch 20 from the bottom to the bottom by actuation of a control signal Sig8. CPU11 carries out mute of the output of the loudspeaker of a handsfree unit 5 to this actuation and coincidence while controlling the contact of a switch 24 by the control signal Sig5 in the open condition from a closed state.

[0045] Consequently, the communication link of digital data of the traffic information communication device 1 is attained between the information offer stations 6 through digital 9600 portable telephone 4a or digital 2400 portable telephone 4. After that, digital 9600 portable telephone 4a or digital 2400 portable-telephone 4b is used, and the RCR. Data communication according to STD-27D "a digital method land mobile radiotelephone system standard" is performed, and information which needs the traffic information communication device 1 and the information offer station 6 is delivered and received. Thus, the information which the traffic information communication device 1 received is transmitted to navigation equipment 2 through the functional expansion unit 2 from the information offer station 6. Similarly, after the information from navigation equipment 2 is transmitted to the traffic information communication device 6 through the functional expansion unit 3, it is sent to the information offer station 6 through digital 9600 portable telephone 4a or digital 2400 portable-telephone 4b from the traffic information communication device 1. Furthermore, navigation equipment 2 is transmitted to a user by displaying the information acquired from the information offer office 6 on display 41a, or carrying out a voice output to the loudspeaker 57 connected to the voice output section 47.

[0046] Thus, after the reception of the information which needs the traffic information communication device 1 from the information offer station 6 is completed, CPU11 of the traffic information communication device 1 controls digital 9600 portable telephone 4a or digital 2400 portable-telephone 4b by the communication equipment control signal, and disconnects the telephone line while it sends out the notice of the completion of information reception to the information offer station 6. The information offer station 6 side which received the notice of the completion of information reception from the traffic information communication device 1 also disconnects the telephone line.

[0047] Next, actuation in case analog type portable telephone 4c is connected to the traffic information communication device 1 is explained. In this case, since auto calling cannot be performed, navigation equipment 2 notifies the message which demands dispatch by the hand control of analog type portable telephone 4c from a user by the display by display 41a, or the voice output by the loudspeaker 57 connected to the voice output section 47. Under the present circumstances, since the discernment result of the model of telephone sets 4a-4b connected to an interface 18 is notified to navigation equipment 2 as mentioned above, the telephone number of the telephone set installed in the information offer station 6 which is a dispatch place is the telephone number of the same model as that type notified of telephone set. Then, it reads from the telephone number table storage section 53, and it displays on display 41a in the case of the above-mentioned message notification, or the voice output of this telephone number is depended and carried out to the loudspeaker 57 connected to the voice output section 47.

[0048] The telephone line will be connected if a user operates analog type portable telephone 4c based on the message to which the dispatch from navigation equipment 2 is urged. The traffic information communication device 1 serves as "talk mode" at the beginning [of this telephone line] of connection. This "talk mode" is the mode in which a user and the operator of an information offer station talk, and since actuation of each part of the traffic information communication device 1 is the same as that of the case of the "talk mode" of an above-mentioned digital type portable telephone, it omits that detailed explanation. After the conversation of a user and the operator of the information offer station 6 finishes, it shifts to "data communication mode" from "talk mode."

[0049] This "data communication mode" is the mode in which the traffic information communication device 1 and the information offer station 6 exchange data, and the shift conditions to "data communication mode" are that the traffic information communication device 1 receives the mode change signal sent out from the information offer station 6. Since reception actuation of the mode change signal of this traffic information communication device 1 is the same as that of the case of an above-mentioned digital type portable telephone, that detailed explanation is omitted. If the traffic information communication device 1 receives the mode change signal from the information offer station 6, the traffic information communication device 1 will send the receiving status of a mode change signal to the functional expansion unit 3. On condition that reception of the mode change signal of the traffic information communication device 1, when are changed into "data communication mode" from "talk mode" and the traffic information communication device 1 judges, or when the functional expansion unit 3 judges and it notifies to the traffic information communication device 1, the traffic information communication device 1 shifts to "data communication mode."

[0050] Under the present circumstances, the signal which delivers and receives by that between analog type cellular-phone 4c and the traffic information communication device 1 turns into a modem signal based on modem standards, such as V.22. The send action of these modems signal and reception actuation are almost the same as sending out actuation of an above-mentioned mode change signal, and reception actuation, and are explained below. Next, the actuation whose traffic information communication device 1 sends out the modem signal based on the modem standard of V.22 grade to analog type portable telephone 4c is explained. CPU11 in the traffic information communication device 1 transmits periodically the modem signal data stored in ROM11a or RAM11b to build in to the voice data processing means 16. This voice data processing means 16 transmits modem signal data to the timing corresponding to the timing of the D/A conversion of D/A,

converter 30 to D/A converter 30. In addition, modem signal data is built in the interior of the voice data processing means 16, and you may make it transmit this modem signal data to it to D/A converter 30 to the timing corresponding to the timing of the D/A conversion of D/A converter 30.

[0051] Thus, after the modem signal which is outputted from D/A converter 30 and by which D/A conversion was carried out has a high frequency component cut by the filter 29, it is amplified by the signal amplifier 27. Gain is adjusted by the control signal Sig2 from CPU11, and this signal amplifier 27 is controlled by the control signal Sig2 so that this gain becomes a suitable value. And CPU11 changes the contact of a change-over switch 20 to the bottom with a control signal Sig8 at the same time it changes the contact of a change-over switch 28 to the bottom with a control signal Sig6, so that the modem signal outputted from the signal amplifier 27 may be supplied to analog type portable telephone 4c. Therefore, the modem signal from the traffic information communication device 1 is outputted by such actuation towards analog type portable telephone 4c.

[0052] Next, actuation in case the traffic information communication device 1 receives the modem signal from analog type portable telephone 4c is explained. In this case, CPU11 changes the contact of a switch 24 into an open condition with a control signal Sig5 at the same time it changes the contact of a change-over switch 19 to the bottom with a control signal Sig7, so that the analog signal (modem signal) from analog type portable telephone 4c may be supplied only to the voice data processing means 16 of the traffic information communication device 1 and may not be supplied to a handsfree unit 5. Thereby, after the analog signal from analog type portable telephone 4c is amplified with the signal amplifier 21 through an interface 18 and a change-over switch 19, a high frequency component is cut with a filter 22, and A/D conversion of it is carried out by A/D converter 23, and it is incorporated by the voice data processing means 16. Here, the signal amplifier 21 can adjust gain with the control signal Sig1 from CPU11, and it is adjusted by the control signal Sig1 so that this gain may become a suitable value.

[0053] The modem signal of the digital gestalt incorporated by the voice data processing means 16 is supplied to CPU11, after predetermined processing of digital filtering etc. is performed within the voice data processing means 16. In CPU11, the symbol of a modem signal is identified by digital signal processing. Thus, the information which the traffic information communication device 1 received is transmitted to navigation equipment 2 through the functional expansion unit 3 from the information offer station 6. Similarly, after the information from navigation equipment 2 is transmitted to the traffic information communication device 1 through the functional expansion unit 3, it is sent to the information offer station 6 through analog type portable telephone 4c from the traffic information communication device 1. Furthermore, navigation equipment 2 is transmitted to a user by displaying the information acquired from the information offer office 6 on display 41a, or carrying out a voice output to the loudspeaker 57 connected to the voice output section 47.

[0054] Thus, after the reception of the information which needs the traffic information communication device 1 from the information offer station 6 is completed, CPU11 of the traffic information communication device 1 sends out the notice of the completion of information reception to the information offer station 6. The information offer station 6 which received this notice of the completion of information reception disconnects the telephone line. Since cutting of the telephone line cannot be performed from the traffic information communication device 1 when analog type cellular-phone 4c is connection, it will wait for cutting of the telephone line from the information offer office 6 side. Under the present circumstances, as for navigation equipment 2, it is desirable that it is made to carry out the voice output of the message which demands cutting of the circuit of a telephone set from a user by the loudspeaker 57 which displays on display 41a or is connected to the voice output section 47.

[0055] As explained above, the classification of the telephone set 4 to connect is identified with the gestalt of operation of this invention, and since it was made for a telephone set 4 to auto-send to the telephone set of the same model with which the information offer station 6 corresponds according to this identified result, a communication link is possible between the telephone sets of the same model. Therefore, since communication link establishment time amount can be shortened irrespective of the difference in the model of telephone set 4 to connect, the stress by a user's latency time is mitigated. Furthermore, since communication link time amount can be shortened as a whole, mitigation-ization of communication link cost can be attained. Moreover, since it was made to direct discernment of the model of telephone set 4, and auto calling of a telephone set 4 automatically with the gestalt of operation of this invention, actuation of a user is easy. Furthermore, with the gestalt of operation of this invention, since the user was notified of the telephone number of the telephone set of the same model with which the information offer office 6 corresponds when a telephone set 4 was not able to be auto-sent, when a user uses the telephone number, a communication link becomes possible between the telephone sets of the same model. Therefore, even when a telephone set 4 cannot be auto-sent, the same effect as **** is acquired.

[0056] In addition, although the telephone set connected to the traffic information communication device 1 has been explained as a portable telephone, it is replaced with this portable telephone and you may make it connect a land mobile radiotelephone to the traffic information communication device 1 in the above explanation. Furthermore, although the gestalt of this operation explained the phase hand with whom the traffic information communication device 1 communicates as an information offer office 6 which offers traffic information, this information offer office 6 does not restrict the contents of that information to traffic information that what is necessary is just the engine which offers a certain information, either.

[0057]

[Effect of the Invention] As explained above, according to this invention, communication link establishment in a short time is attained irrespective of the difference in the model of telephone set connected by the telephone set in the communication device which can communicate data with an information offer station.

[Translation done.]

* NOTICES *

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1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the block diagram showing the whole system configuration containing the communication device of the gestalt of operation of this invention.

[Drawing 2] It is the block diagram showing the detailed configuration of the communication device shown in drawing 1.

[Drawing 3] It is the block diagram showing the detailed configuration of the navigation equipment shown in drawing 1 and drawing 2.

[Description of Notations]

- 1 Traffic Information Communication Device
- 2 Navigation Equipment
- 3 Functional Expansion Unit
- 4 Telephone Set
- 4a Digital 9600 portable telephone
- 4b Digital 9600 portable telephone
- 4c Analog type portable telephone
- 5 Handsfree Unit
- 6 Information Offer Station
- 11 CPU (Central Processing Unit)
- 12 External Unitdata Exchange Means
- 13 Voice Data Processing Means
- 14 ROM (Read Only Memory)
- 15 Nonvolatile Memory
- 16, 17, 18 Interface
- 19, 20, 28 Change-over switch
- 21, 25, 26, 27 Signal amplifier
- 22 29 Filter
- 23 A/D Converter
- 24 Switch
- 30 D/A Converter
- 40 Operation Part
- 41 Display
- 41a Display
- 45 Map Information Storage Section
- 46 Speech Recognition Section
- 47 Voice Output Section
- 53 Telephone Number Table Storage Section
- 52 Microphone
- 61 Screen Management Section
- 60 Map Management Department
- 62 Input Management Department
- 65 Whole Management Department
- 64 Communication Management Section

[Translation done.]